Water quality and tournament-related mortalities for black bass: Mattawoman Creek (2005 – 2008)

Joe Love, PhD
Tidal Bass Manager
Division of Inland Fisheries
Maryland Department of Natural Resources

The Washington Post

TODAY'S NEWSPAPER
Subscribe | PostPoints

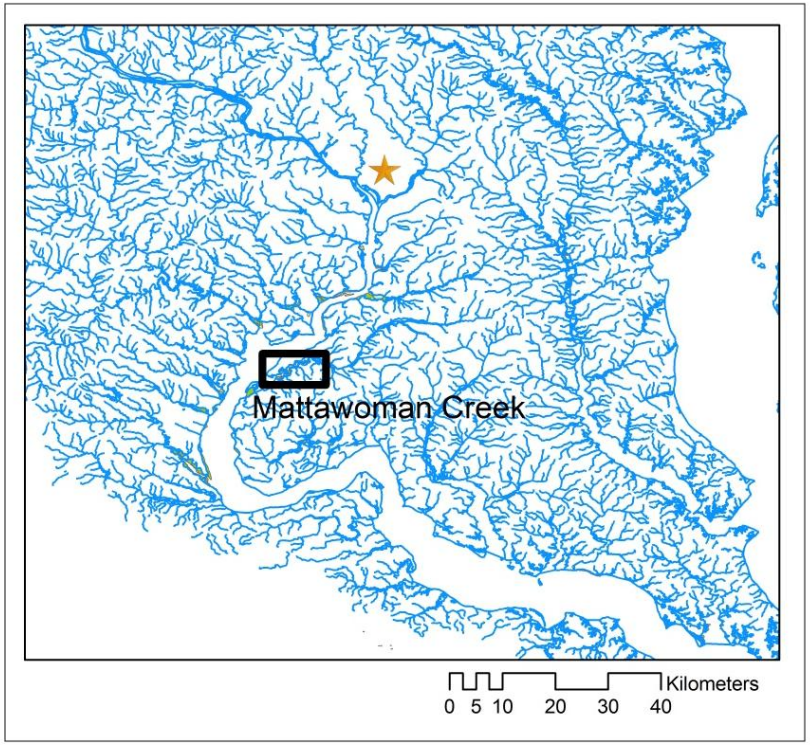
Mattawoman on Endangered List

Rivers Group Cites Threat Posed by Highway Project

By Megan Greenwell
Washington Post Staff Writer
Thursday, April 9, 2009; Page SM01

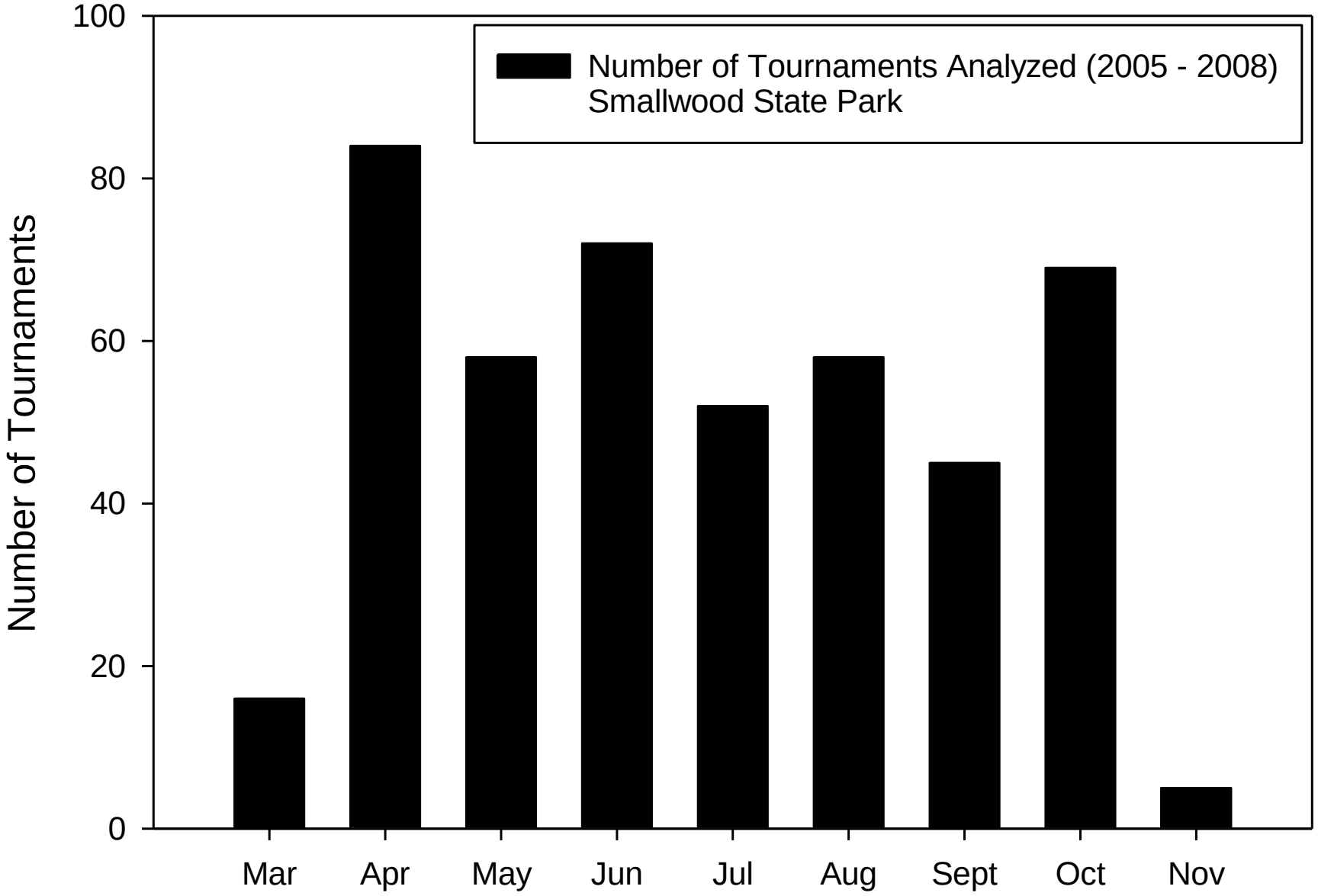
A national environmental group has jumped into the fray over a proposed highway that would cut through the Mattawoman Creek watershed, labeling the Potomac River tributary one of the most endangered waterways in America.

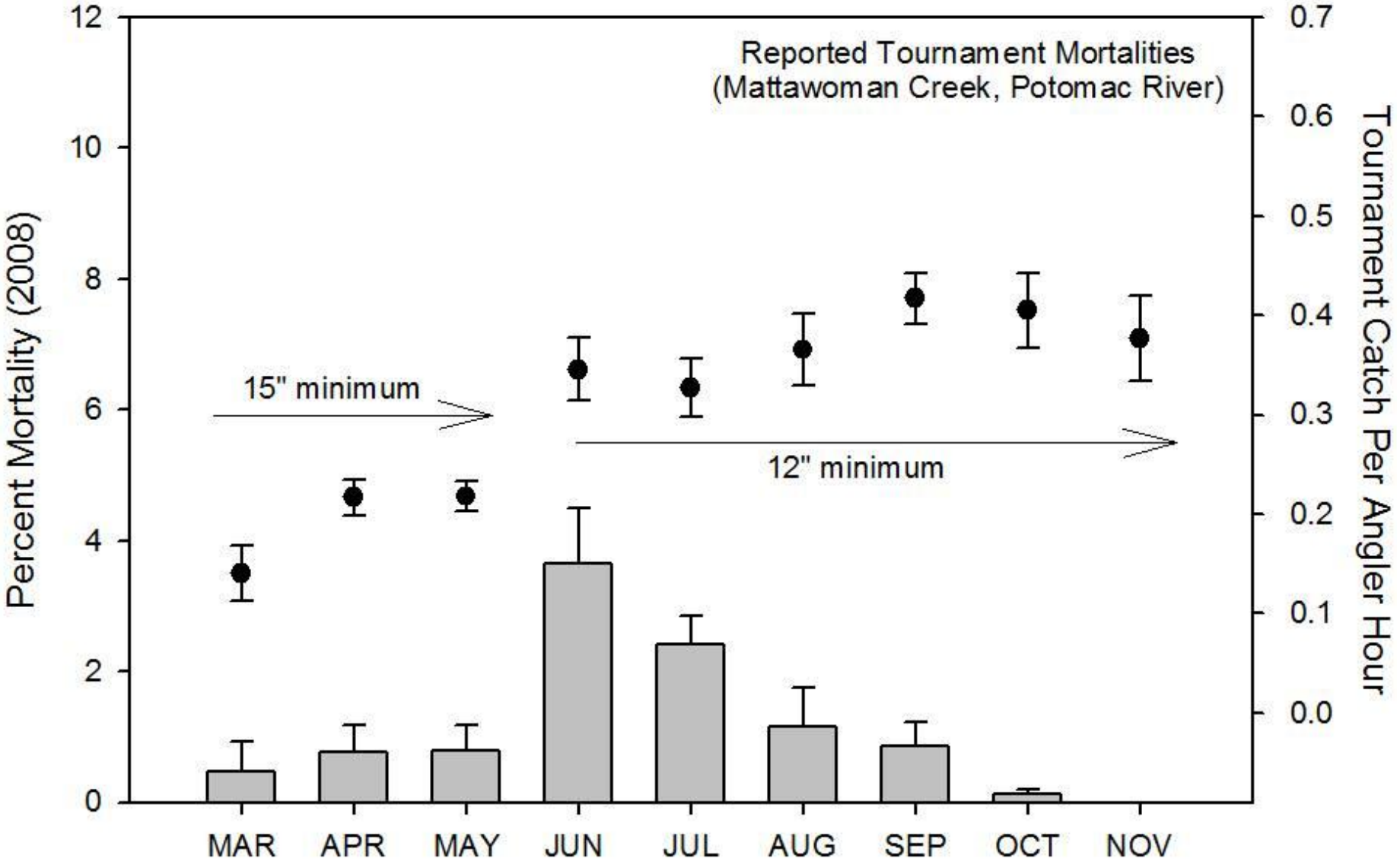
Officials said the final phase of the cross-county connector would devastate the creek's clean water and abundant wildlife while posing a serious risk to the Chesapeake Bay. The Mattawoman is one of the bay's cleanest tributaries and has been called one of the most ecologically valuable waterways on the Eastern Seaboard.

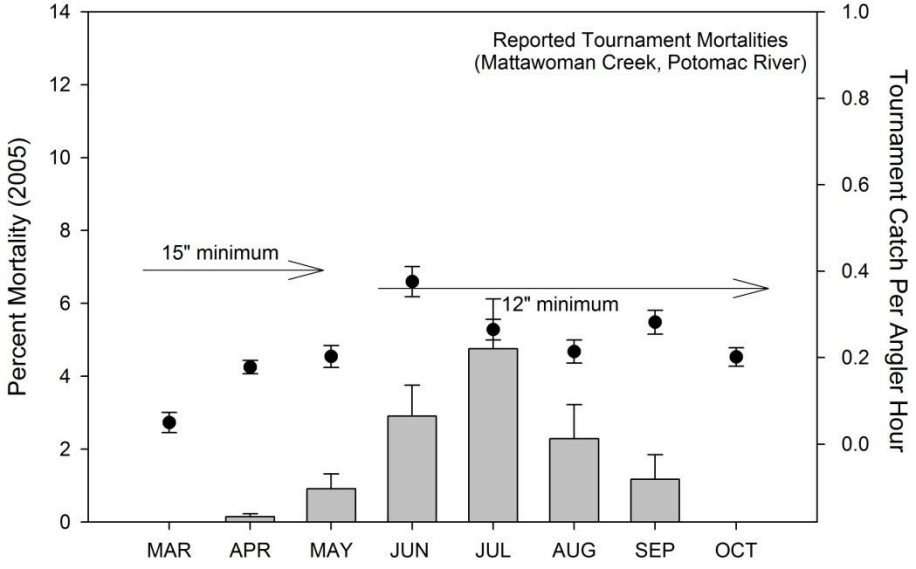


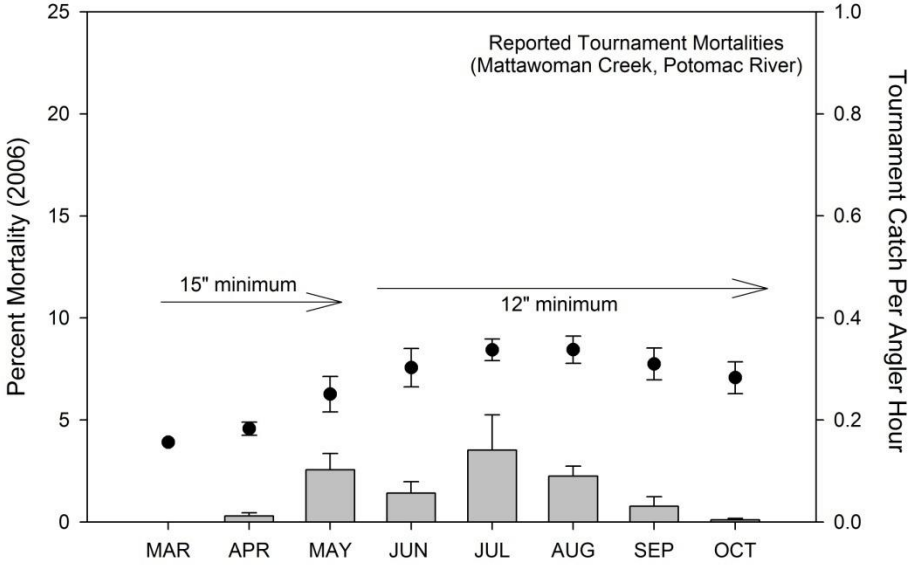

usbank
Five Star Service Guaranteed
STREN
WEED EATER
FLW OUTDOORS
LOOK for the HOOK

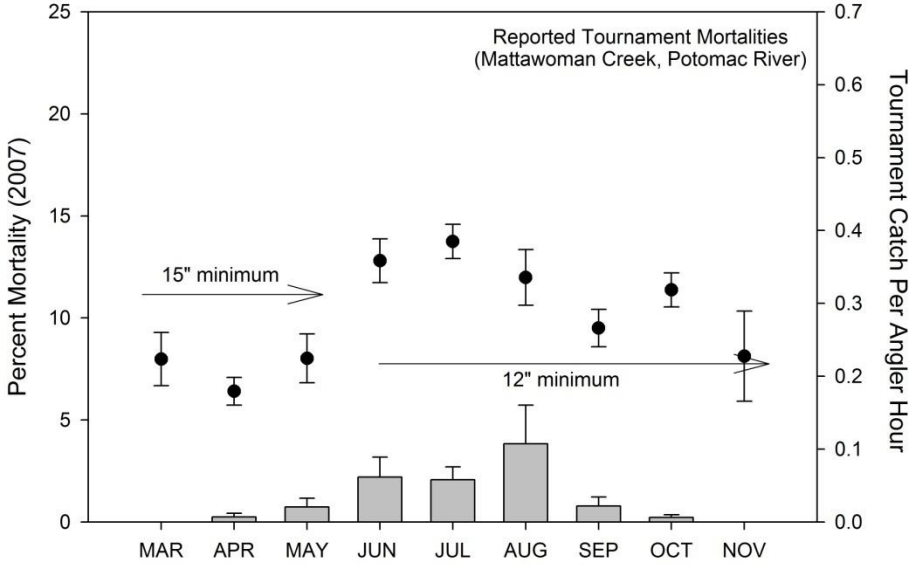

BASSMASTER

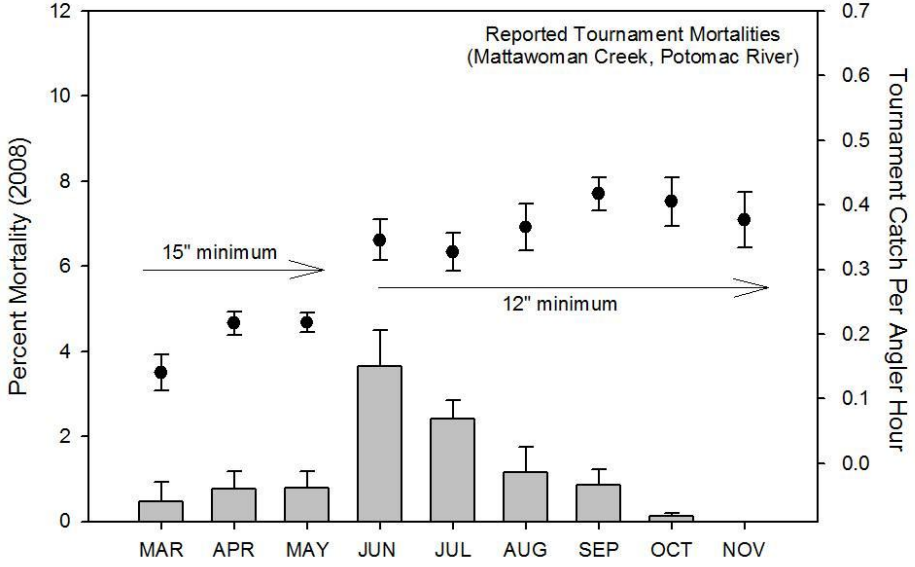

Number of Tournaments Analyzed (2005 - 2008)
Smallwood State Park
Number of Tournaments
100
80
60
40
20
0
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov


Reported Tournament Mortalities
(Mattawoman Creek, Potomac River)
15" minimum
12" minimum
Percent Mortality (2008)
Tournament Catch Per Angler Hour
0
2
4
6
8
10
12
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV


Reported Tournament Mortalities
(Mattawoman Creek, Potomac River)
Percent Mortality (2005)
Tournament Catch Per Angler Hour
15" minimum
12" minimum
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT


Reported Tournament Mortalities
(Mattawoman Creek, Potomac River)
Percent Mortality (2006)
Tournament Catch Per Angler Hour
15" minimum
12" minimum
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT

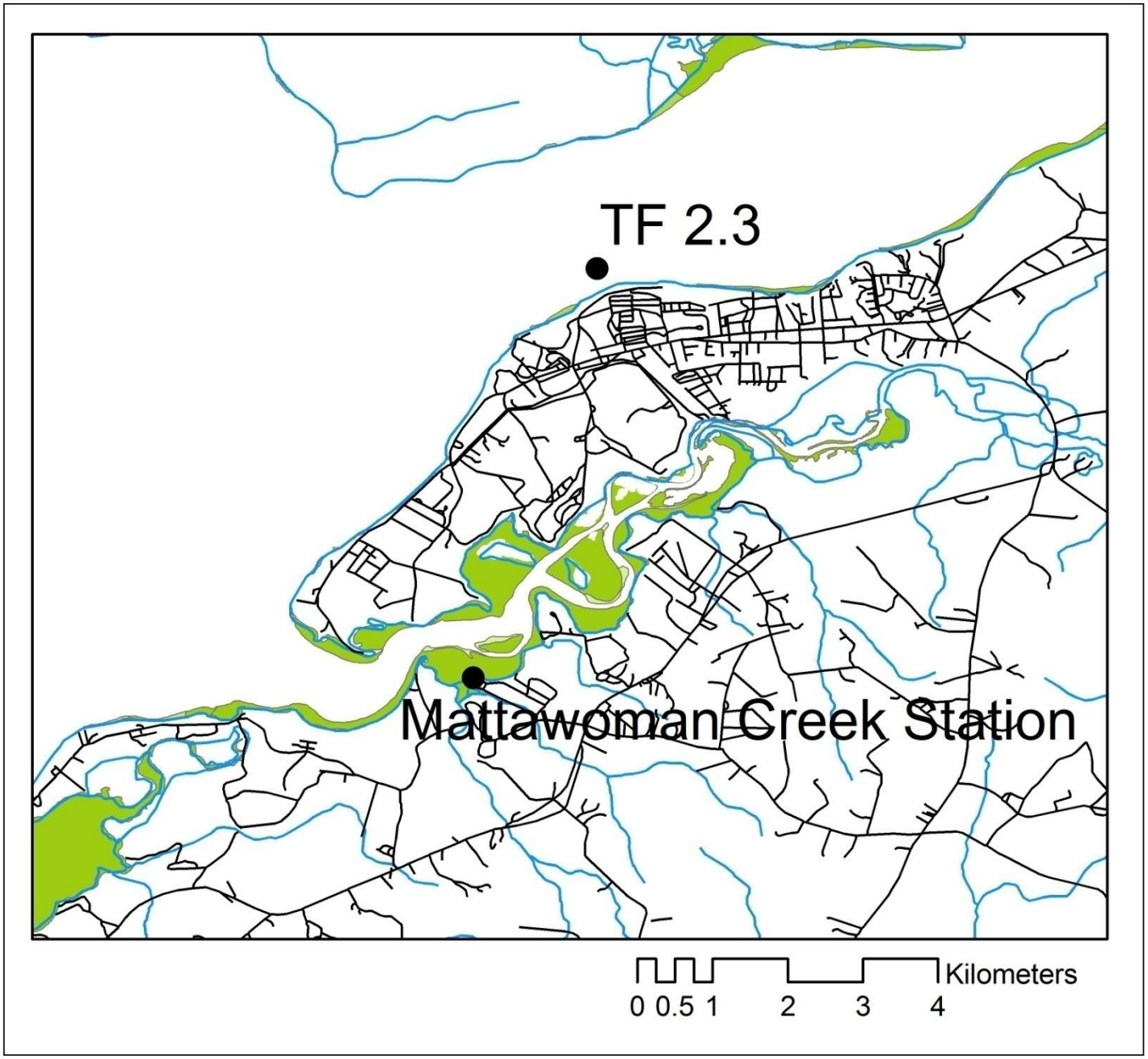

Reported Tournament Mortalities
(Mattawoman Creek, Potomac River)
Percent Mortality (2007)
Tournament Catch Per Angler Hour
15" minimum
12" minimum
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV


Reported Tournament Mortalities
(Mattawoman Creek, Potomac River)
Percent Mortality (2008)
Tournament Catch Per Angler Hour
15" minimum
12" minimum
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV

General Approach

- Summarize diurnal habitat conditions on dates of tournaments with habitat gradients

- Relate habitat gradients to tournament mortalities


TF 2.3
Mattawoman Creek Station
0 0.5 1 2 3 4
Kilometers

General Approach

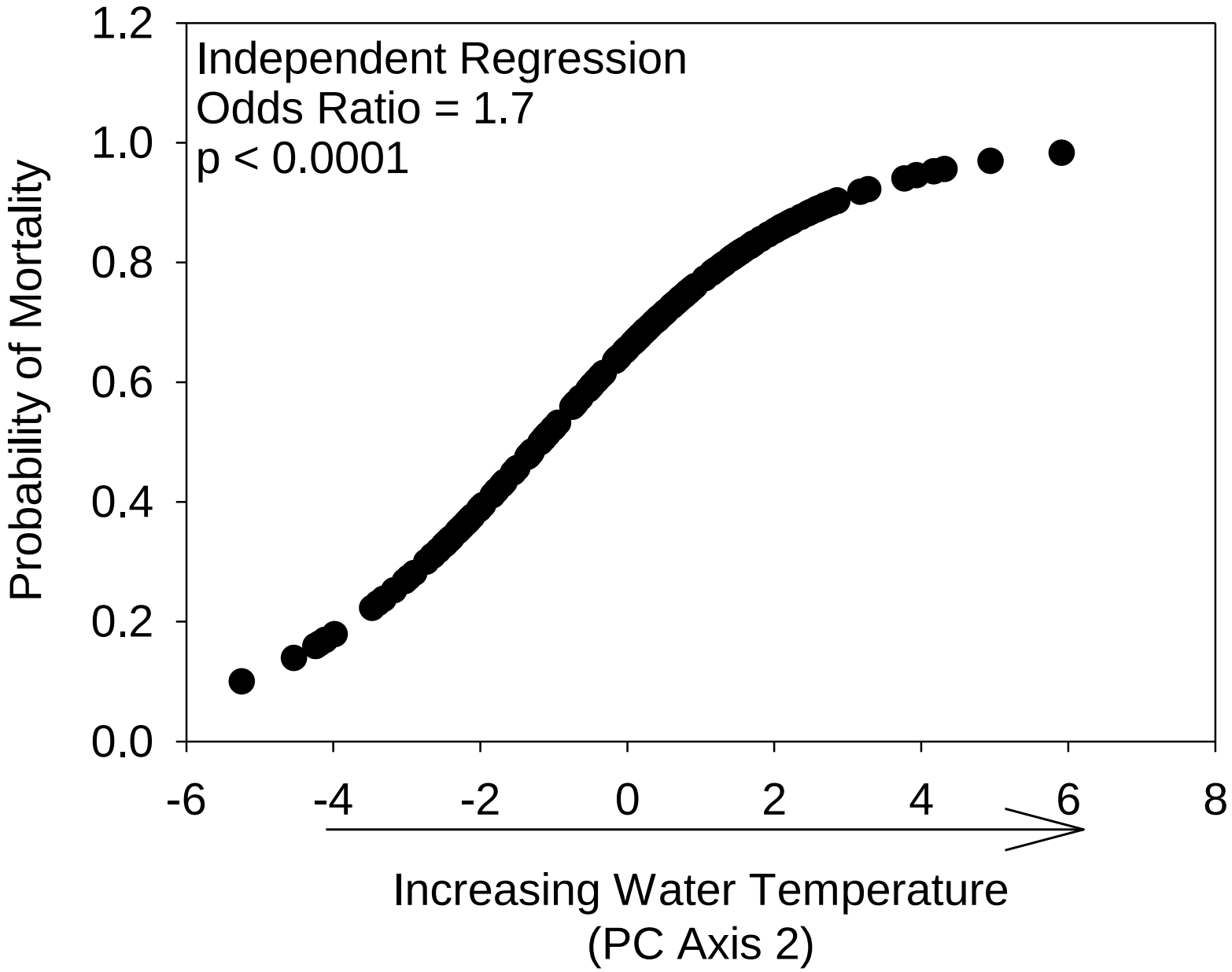
- Summarize diurnal habitat conditions on dates of tournaments with habitat gradients
  - PC axis 1: highly correlated with conductivity/chl a
  - PC axis 2: highly correlated with water temperature
  - PC axis 3: highly correlated with dissolved oxygen
  - PC axis 4: highly correlated with angling effort

- Relate habitat gradients to tournament mortalities
  - Incidence of mortality (presence/absence)
  - Level of mortality (percentage)

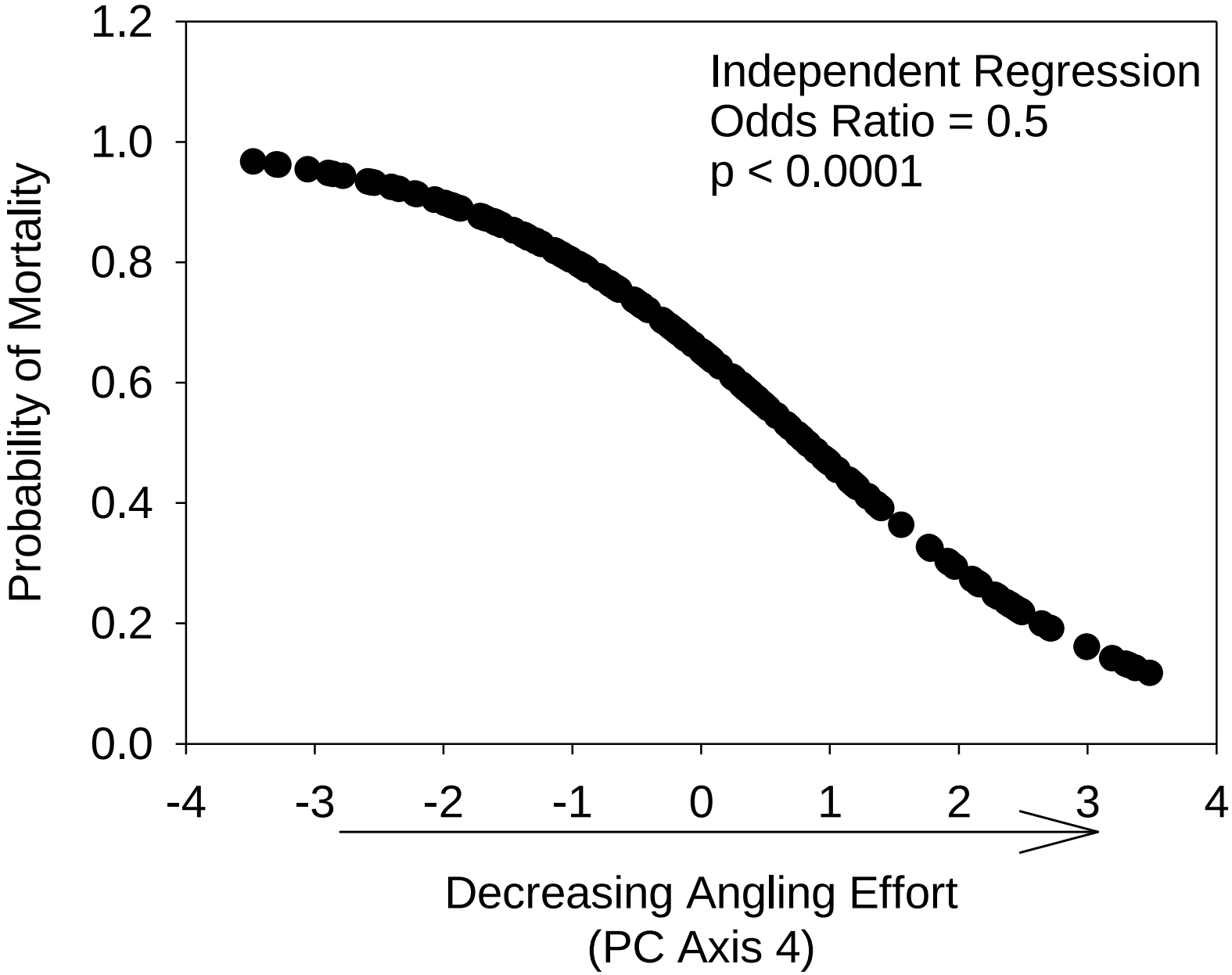
Incidence of Mortality

Full Model Effect ($\rho^2 = 0.40$, LL = - 117.4, $p < 0.0001$)	**Odds Ratio**	**Upper**	**Lower**	**P-value**
Water Temp (PC2)	2.09	2.69	1.62	< 0.0001
Angling Effort (PC4)	0.33	0.48	0.23	< 0.0001
Dissolved Oxygen (PC3)	0.81	1.02	0.64	0.07

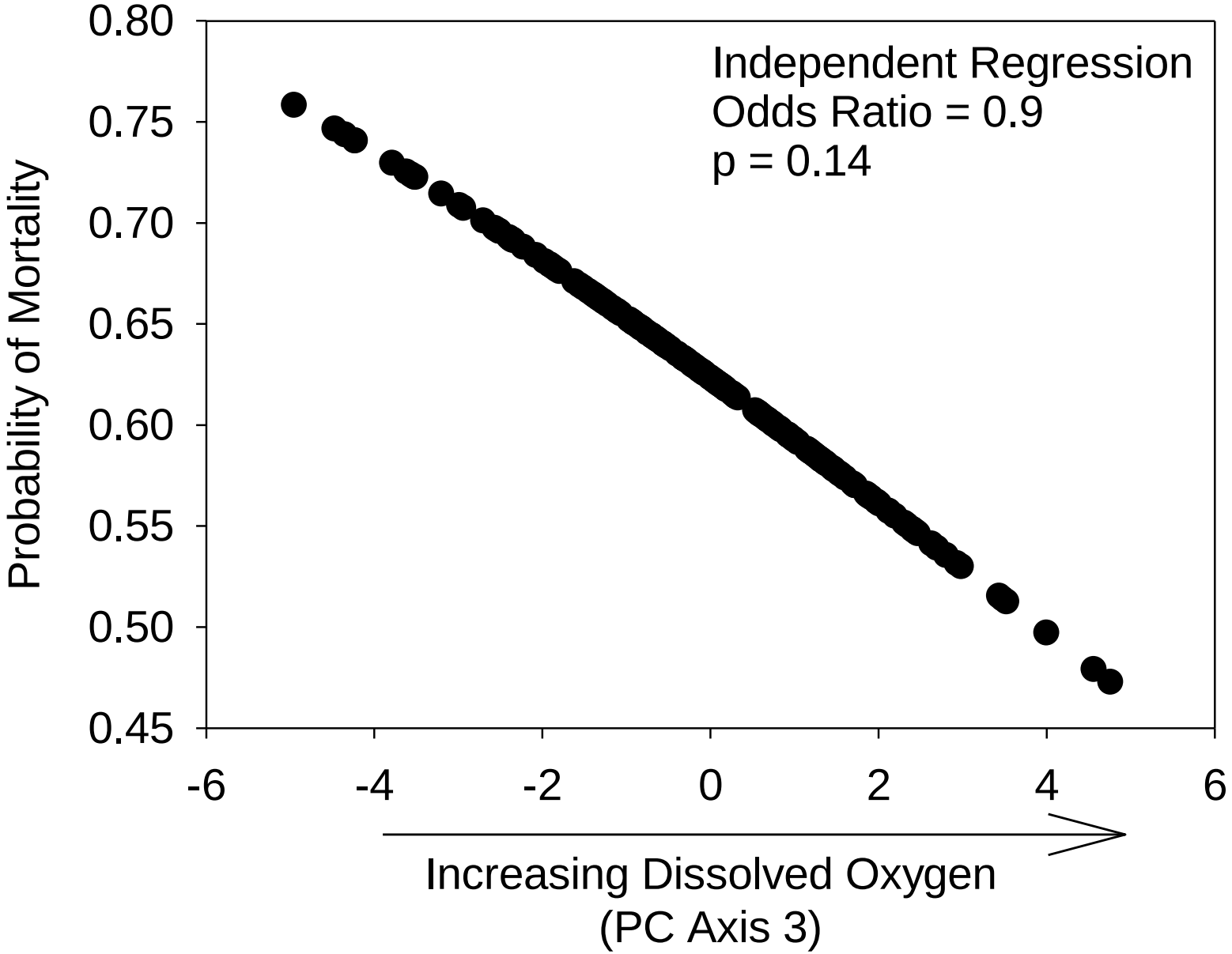
Incidence of Mortality

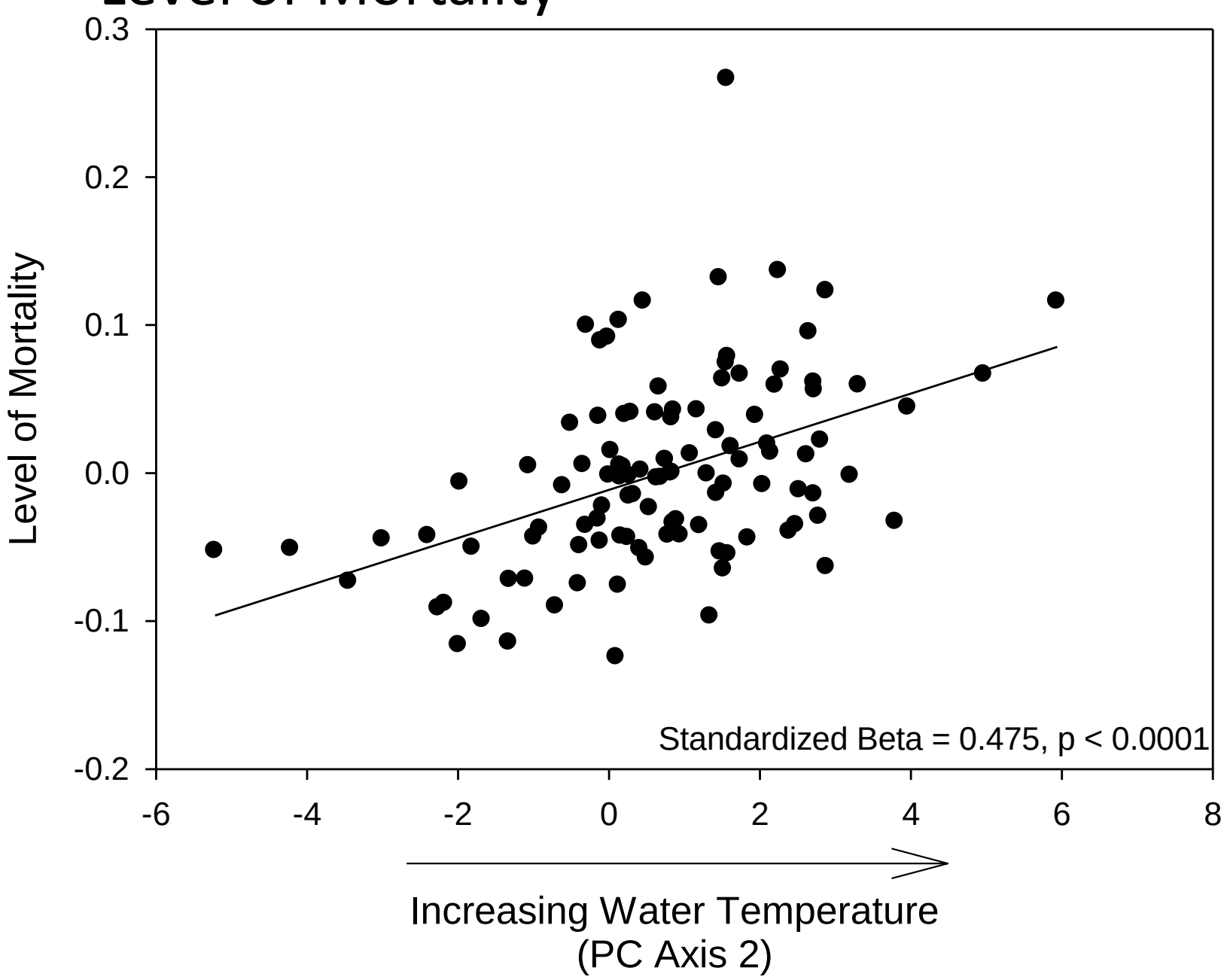


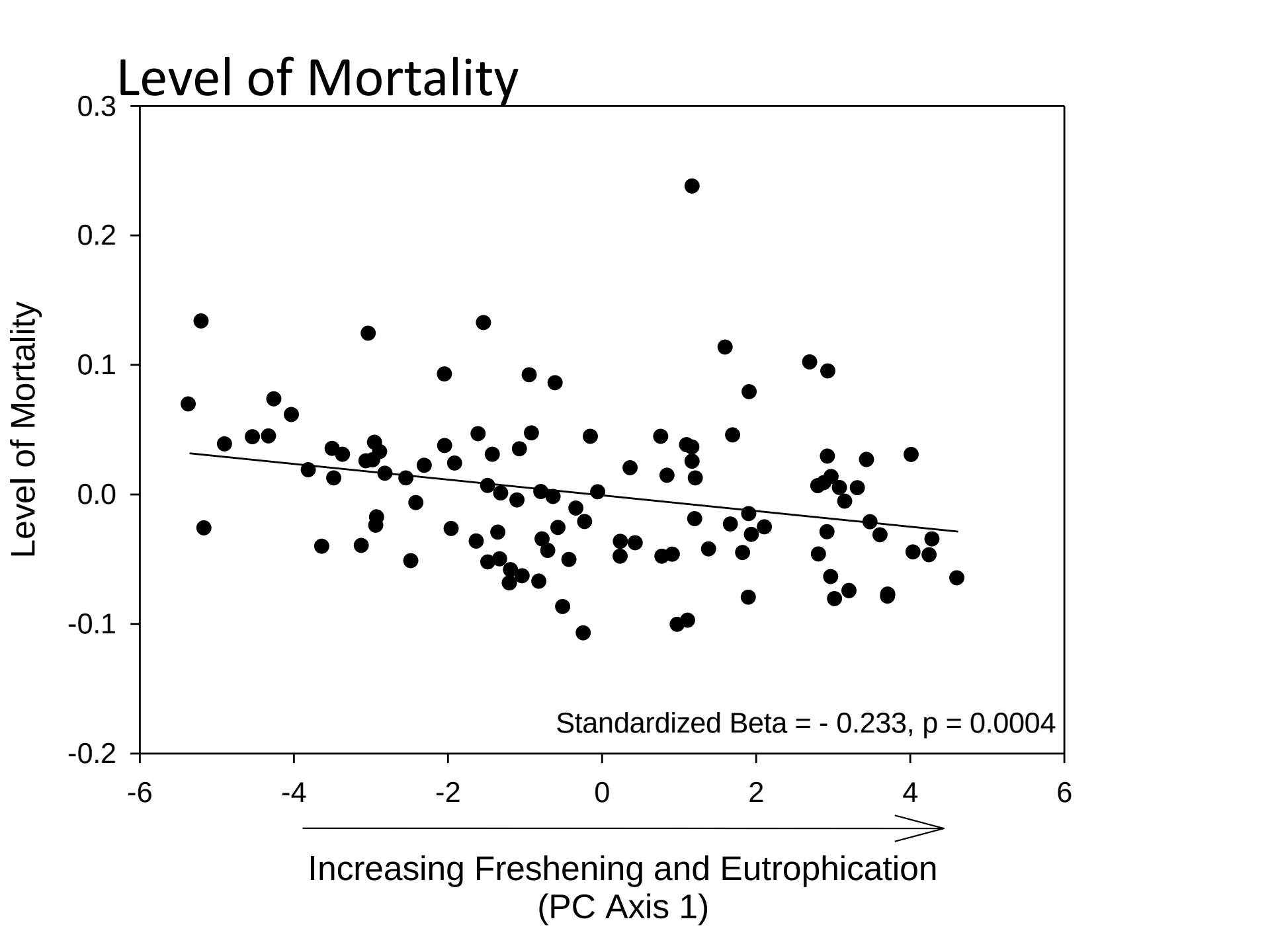
Incidence of Mortality



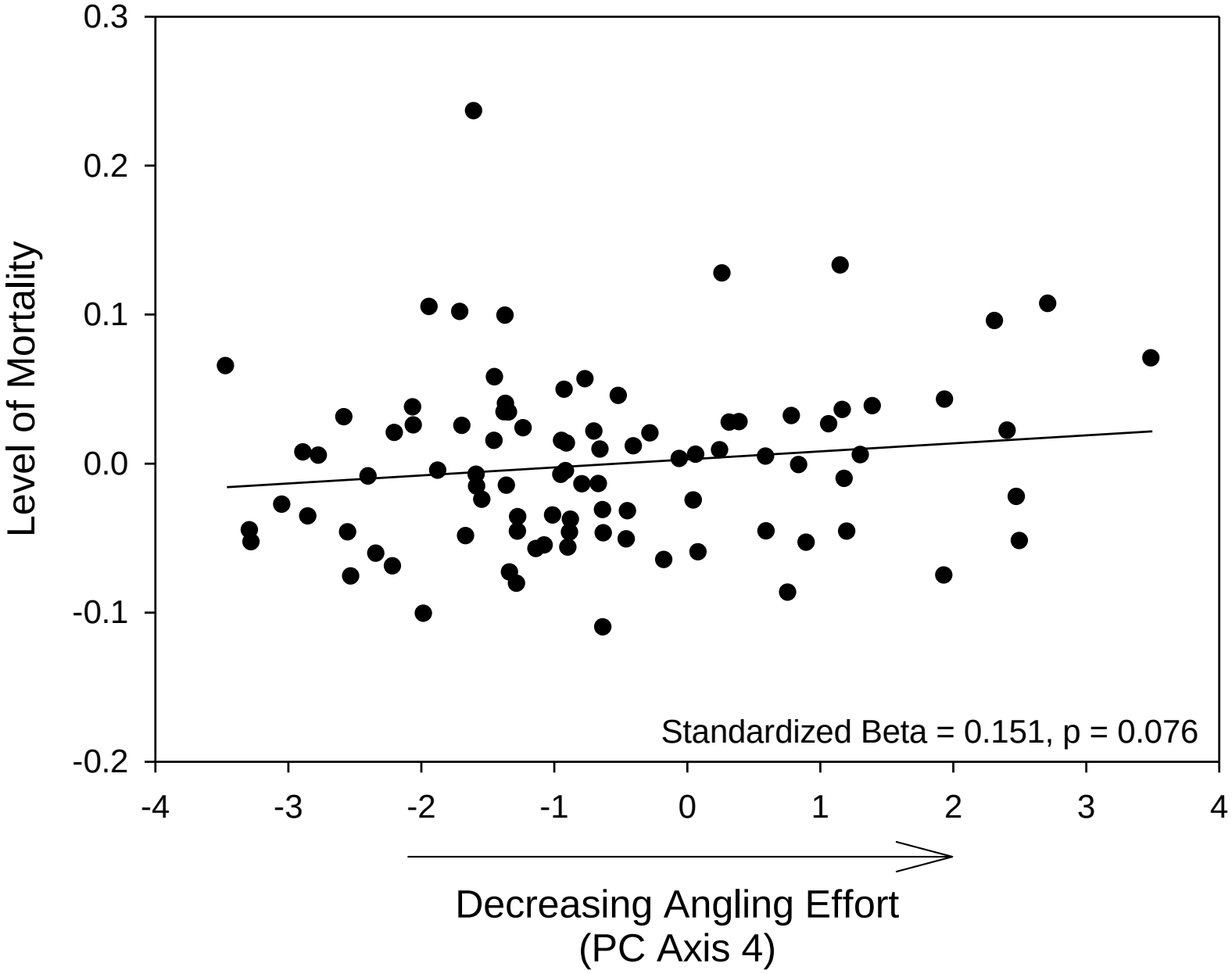
Incidence of Mortality

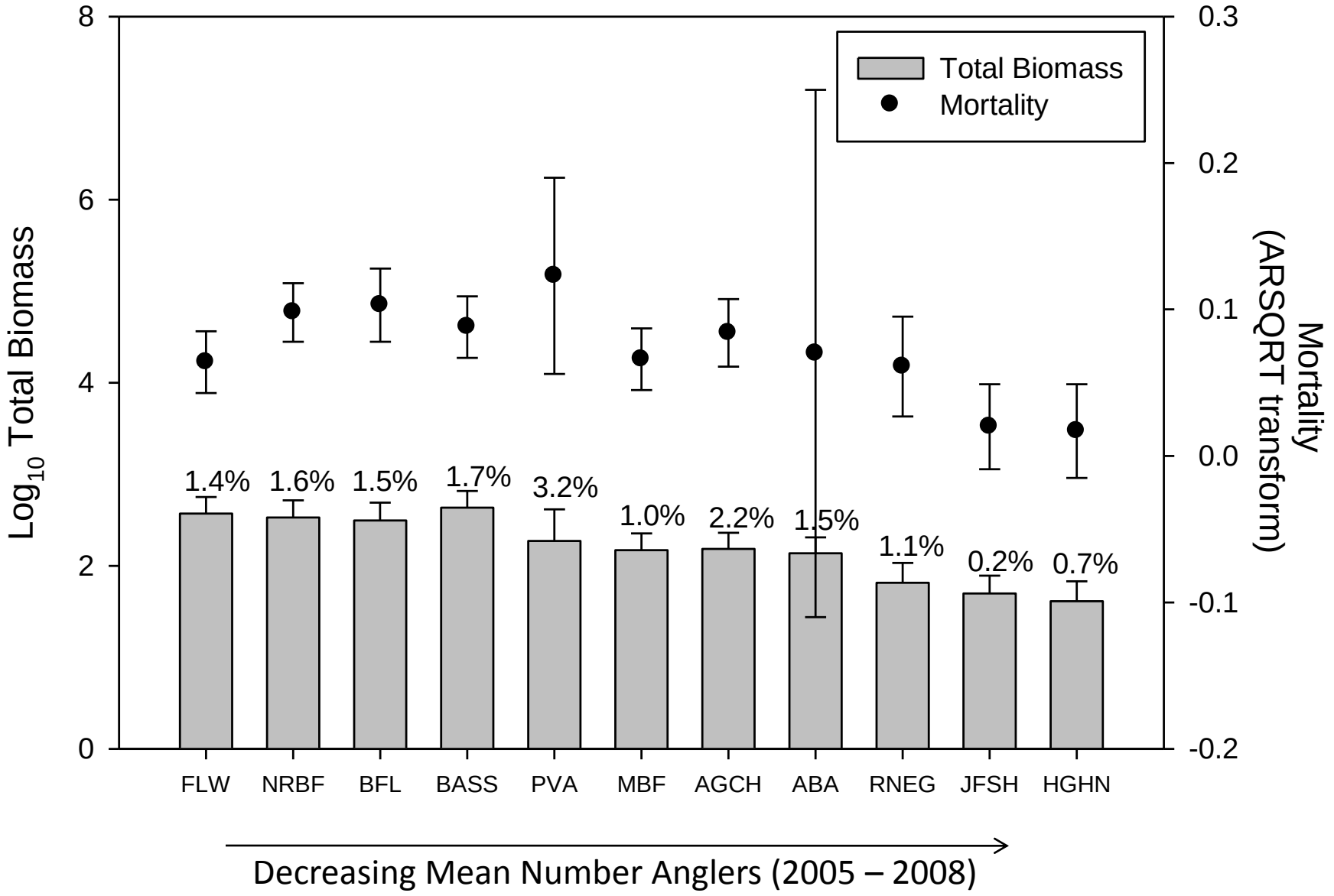



Level of Mortality
0.3
0.2
0.1
0.0
-0.1
-0.2
Level of Mortality
Standardized Beta = 0.475, p < 0.0001
-6
-4
-2
0
2
4
6
8
Increasing Water Temperature
(PC Axis 2)


Level of Mortality
0.3
0.2
0.1
0.0
-0.1
-0.2
Level of Mortality
Standardized Beta = - 0.233, p = 0.0004
-6
-4
-2
0
2
4
6
Increasing Freshening and Eutrophication
(PC Axis 1)

Level of Mortality




Total Biomass
Mortality
Log10 Total Biomass
Mortality (ARSQRT transform)
8
6
4
2
0
0.3
0.2
0.1
0.0
-0.1
-0.2
1.4%
1.6%
1.5%
1.7%
3.2%
1.0%
2.2%
1.5%
1.1%
0.2%
0.7%
FLW
NRBF
BFL
BASS
PVA
MBF
AGCH
ABA
RNEG
JFSH
HGHN
Decreasing Mean Number Anglers (2005 – 2008)

Conclusions

- Environment plays a more important role than angling effort in explaining variation in initial tournament mortalities
- Different handling practices or timing of tournaments among groups may explain variation in the level of initial mortality among groups
- Delayed mortality estimates should also be examined in future work